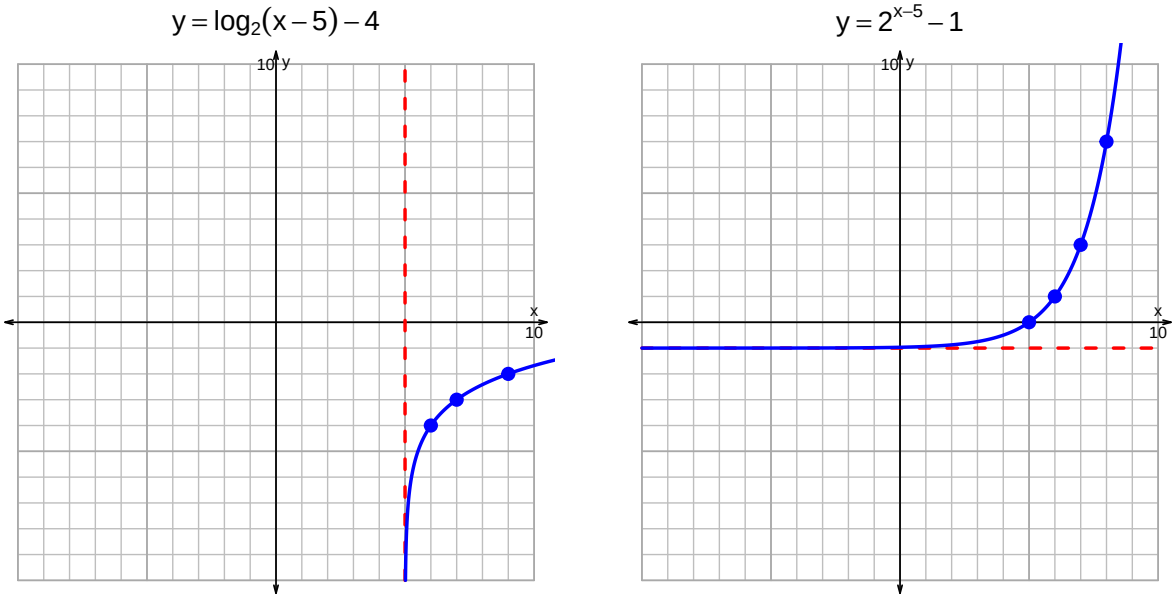
Name: Date:

s18: EXP LOG (SLTN v337)

1. (10 pts) Graph $y = \log_2(x-5) - 4$ and $y = 2^{x-5} - 1$ on the grids below. Also, draw any asymptotes with dashed lines.



Somewhat useful hint: $2^3 = 8$, *and thus* $\log_2(8) = 3$.

2. (10 pts) Write (but do not evaluate) the solution to the equation below by writing a logarithmic expression. Please do not do any arithmetic; just move numbers around.

$$11 = \left(\frac{5}{7}\right) \cdot 2^{4t/3}$$

Divide both sides by $\frac{5}{7}$.

$$\frac{11 \cdot 7}{5} = 2^{4t/3}$$

Take log, base 2, of both sides.

$$\log_2\left(\frac{11 \cdot 7}{5}\right) = \frac{4t}{3}$$

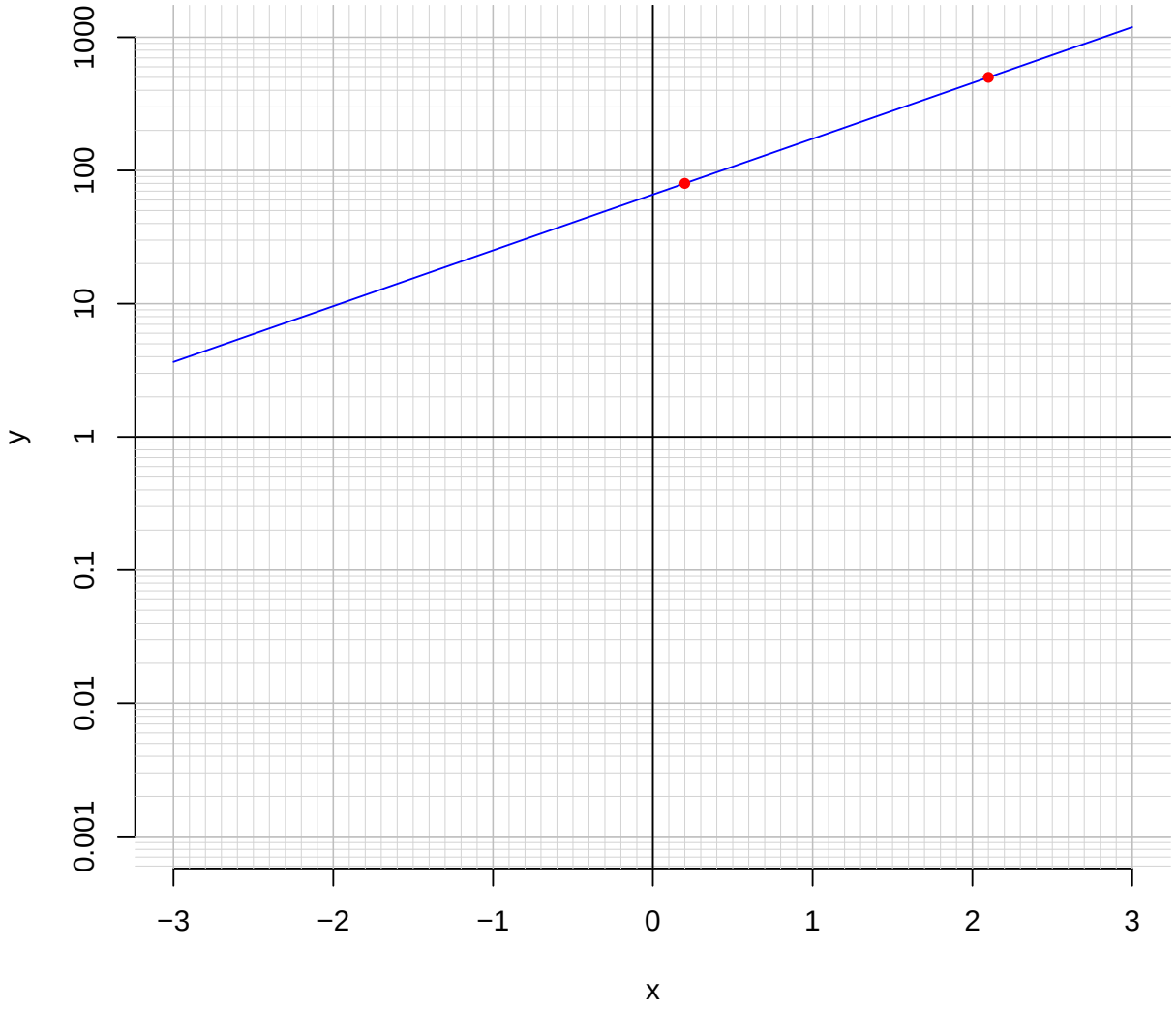
Divide both sides by $\frac{4}{3}$.

$$\frac{3}{4} \cdot \log_2\left(\frac{11 \cdot 7}{5}\right) = t$$

Switch sides.

$$t = \frac{3}{4} \cdot \log_2\left(\frac{11 \cdot 7}{5}\right)$$

3. (10 pts) An exponential function $f(x) = 66 \cdot e^{0.965x}$ is graphed below on a semi-log plot.



a. Using the plot above, evaluate $f(2.1)$.

$$f(2.1) = 500$$

b. The inverse function is logarithmic.

$$f^{-1}(x) = \frac{1}{0.965} \cdot \ln\left(\frac{x}{66}\right)$$

Using the plot above, evaluate $f^{-1}(80)$.

$$f^{-1}(80) = 0.2$$